$$\delta E = \frac{4\pi}{3}\frac{e^2}{\rho}\beta^3\gamma^4$$

$$A^{\alpha}(x) = \frac{4\pi}{3}\int d^4x' D_r(x - x')J^{\alpha}(x')$$

$$\Phi(\mathbf{x}, t) = \frac{1}{4\pi\varepsilon_0}\int d^3x' \frac{1}{R}[\rho(\mathbf{x}', t')]_{\mathrm{ret}}$$

$$\mathbf{A}(\mathbf{x}, t) = \frac{\mu_0}{4\pi}\int d^3x' \frac{1}{R}[\mathbf{J}(\mathbf{x}', t')]_{\mathrm{ret}}$$

$$\Phi(\mathbf{x}, t) = \left[\frac{e}{(1 - \boldsymbol{\beta}.\mathbf{n})R}\right]_{\mathrm{ret}}$$

$$\mathbf{A}(\mathbf{x}, t) = \left[\frac{e\boldsymbol{\beta}}{(1 - \boldsymbol{\beta}.\mathbf{n})R}\right]_{\mathrm{ret}}$$

$$\mathbf{E} = -\nabla\Phi - \frac{\partial\mathbf{A}}{\partial t}$$ Jackson 1999, p. 239

$$\mathbf{B} = \nabla\times\mathbf{A}$$

$$\mathbf{B} = [\mathbf{n}\times\mathbf{E}]_{\mathrm{ret}}$$ Jackson 1999, p. 665

$$\mathbf{E}(\mathbf{x}, t) = e\left[\frac{\mathbf{n} - \boldsymbol{\beta}}{\gamma^2(1 - \boldsymbol{\beta}.\mathbf{n})^3 R^2}\right]_{\mathrm{ret}} + \frac{e}{c}\left[\frac{\mathbf{n}\times\{(\mathbf{n} - \boldsymbol{\beta})\times\dot{\boldsymbol{\beta}}\}}{(1 - \boldsymbol{\beta}.\mathbf{n})^3 R}\right]_{\mathrm{ret}}$$

$$\mathbf{E}_a = \frac{e}{c}\left[\frac{\mathbf{n}\times(\mathbf{n}\times\dot{\boldsymbol{\beta}})}{R}\right]_{\mathrm{ret}}$$ Jackson 1999, p. 666

$$\mathbf{S} = \frac{c}{4\pi}\mathbf{E}\times\mathbf{B} = \frac{c}{4\pi}\left|\mathbf{E}_a\right|^2\mathbf{n}$$

$$\frac{dP}{d\Omega} = \frac{c}{4\pi}\left|R\mathbf{E}_a\right|^2 = \frac{e^2}{4\pi c}\left|\mathbf{n}\times\left(\mathbf{n}\times\dot{\boldsymbol{\beta}}\right)\right|^2$$

$$\frac{dP}{d\Omega} = \frac{e^2}{4\pi c^3}\left|\dot{\mathbf{v}}\right|^2\sin^2\Theta$$

$$P = \frac{2}{3}\frac{e^2}{c^3}\left|\dot{\mathbf{v}}\right|^2$$

$$P = \frac{2}{3}\frac{e^2}{mc^3}\left(\frac{d\mathbf{p}}{dt}\cdot\frac{d\mathbf{p}}{dt}\right)$$

Jackson 1999, p. 666

$$P = -\frac{2}{3}\frac{e^2}{mc^3}\left(\frac{dp_\mu}{d\tau}\frac{dp^\mu}{d\tau}\right)$$

$$P = \frac{2}{3}\frac{e^2}{c}\gamma^6[\dot{\boldsymbol{\beta}}^2 - (\boldsymbol{\beta}\times\dot{\boldsymbol{\beta}})^2]$$

$$P = \frac{2}{3}\frac{e^2}{mc^3}\left(\frac{dp}{dt}\right)^2$$

Jackson 1999, p. 667

$$P = \frac{2}{3}\frac{e^2}{mc^3}\left(\frac{dE}{dx}\right)^2$$

$$\left|\frac{d\mathbf{p}}{d\tau}\right| = \gamma\omega\left|\mathbf{p}\right| >> \frac{1}{c}\frac{dE}{d\tau}$$

$$P = \frac{2}{3}\frac{e^2}{mc^3}\gamma^2\omega^2|\mathbf{p}|^2 = \frac{2}{3}\frac{e^2 c}{\rho^2}\beta^4\gamma^4$$

$$\delta E = \frac{2\pi\rho}{c\beta}P = \frac{4\pi}{3}\frac{e^2}{\rho}\beta^3\gamma^4$$

$$m_{67} = -C_\gamma E_0^3[(\{l/B\rho)B_y]^2(2\pi l)^{-1}$$